REPORTS ON GEOLOGY OF COUNTRY EAST OF FARINA, AND NORTHWARD TO LAT. 23° 10′.

[Estimated cost of printing (1,200), £7 4s. 7d. Lithographing (1 map), £7 0s. 0d.]

REPORT on ROUTE to QUEENSLAND BORDER, and 180 miles on the BOUNDARY between QUEENSLAND and THE NORTHERN TERRITORY.

Trip to the North with the Queensland Boundary Survey Party, from Farina to about Lat. 23° 15′.

From Farina to Mundowadana Station is about thirty miles, over undulating country strewn with stones, large patches of white decomposed gypsum, and a few sandhills, which latter have no defined direction, but seem to follow the creek from which they derive their sand, and are covered with bushes, whilst the flats are almost destitute of vegetation. About twenty miles the road turns to the north-east, where the Willouran Hills are lost sight of. (These are the last hills worthy of a name for several hundred miles north.) There are many table-hills to east and west, with a few sandhills. At Mundowadana, there is a spring of very fair water; it is one of the same group as the Hergott, and is probably thrown up by the primiary rocks, which up to this are at no very great distance from the surface, but northwards from here seem to dip suddenly down to a considerable depth, as proved by the Tarkanina bore.

To Nantowapunna Waterhole, fourteen miles, over table-hills and clay flats strewn with stones of desert quartzite, with little vegetation; what bushes there are are in the creeks and on the sandhills.

The waterhole is a fine piece of water about one mile long, not very wide, but deep.

To Lake Edith is about seven miles, over clay flats covered with stones. About half way there is a ridge that divides the watershed of Lake Edith from Lake Harry.

Lake Edith is now a dam for watering travelling stock, but there had been no rain since its completion, when I passed. The material removed was mostly gypseous clay, in which were some pieces of brown iron ore and crystalline gypsum.

To Wyeculcona Waterhole is twelve miles. For the first six miles the road runs between Lake Harry and Lake Edith, passing over stony flats; to the west of the former are table-hills. At about half way is a good-sized sandhill running north-west, and on the other side of this are stony flats all the way to the waterhole, where there is a bed of ferruginous sandstone.

To Dulkaninna is about twenty miles, over stony flats and sandhills, with table-hills to east and west. Close to the waterhole is a bed of ferruginous sandstone, and in a well being sunk by the creek are red and white laminated clays.

To Blazes Well, about ten miles over stony plains and sandhills, with several table-hills to the east and west. The well is about 90ft., and is sunk in alluvial sand and drift, which yields good water.

To Etadunna, fifteen miles. The road crosses two or three sandhills, then over some stony flats to Milman's Pile, which is a low ridge of ferruginous quartzite and yellow and grey sandstone; strike, west-north-west. Passing the Pile, the road crosses the flooded plains of Cooper's Creek to Etadunna, where the well, which is about 70ft. deep in alluvium, gives water that is highly charged with sulphate of magnesia.

To Kopperamana Mission Station is about twelve miles, over stony and cracked plains, with table-hills to the north-east. The well in the shallow alluvium has very good water.

To the White Well, near Mulka Hill, is about twenty miles, the road crossing sandhills for about fifteen miles, where there are some beds of ferruginous sandstone outcropping in the flats between the sandhills. The well here is about the best on the road; it is about 100ft. deep, being sunk in white sandstone and pipeclay: there is also, I believe, a good supply.

To Mungeranie Well, about twenty-four miles, passing Muka and Kuntha Hills, which are the usual table formation, over stony flats and sandhills. There is a quarry by the well, of white sandstone, in which I found traces of fossil plants. There are two wells here; one, a deep well sunk in white sandstone and pipeclay, is salt; but the other, which is sunk in the alluvium of the creek, is good water.

To Kirrawadinna Waterhole, sixteen miles, the road runs up a hill to the top of the table-land, which is thickly strewn with stones, and has one or two sand ridges with table-hills to the west.

To Clark's Berlino Station, sixteen miles, the road crosses stony flats, with sand ridges, for about five miles, when it runs across the hard claypan of Lake Howitt, on the other side of which are some beds of ferruginous sandstone, the rest of the way to the station being over stony flats. At the station there are two wells, the first, about 30ft. deep, in a sandy gypseous rock, is brackish; whilst the other, which is 20ft. deep in gypseous clay and soft sandstone, is fresh, but is only fair water.

To Wanawarawampaninna Waterhole is about thirty-five miles. The first ten miles of the road crosses stony table-hills and sandhills; then it comes to the Warburton River, which it follows for ten miles, then leaves it to turn to the east into the sandhills, where there is a small native well of good water; after this it keeps several miles to the east, thus cutting off some large bends of the river. There are sandhills all the way on the east side.

To Goyder's Lagoon thirty miles, following the river for about twelve miles over stony hills, the road leaves it to cross several sandhills, on the other side of which are eighteen miles of flooded flats to Goyder's Lagoon. This waterhole is curiously situated in the middle of large plains, with no channel flowing in or out of it.

To the Queensland boundary—about sixty miles—the track runs up the flooded flats of the Mulligan, with sandhills on each side, passing one or two fine waterholes.

To Annandale Station, forty miles flooded flats and sandhills; it is sixteen miles from here to Fraser's Station at the junction of the Herbert and Mulligan, and 100 miles up the Mulligan to Sandringham Station. All the way flooded flats with waterholes and sandhills on each side.

Following the east and west line from the Mulligan to the west corner is all sandhills and sandflats, except at the corner, where there are some salt clay flats.

On the north and south line for 160 miles are nothing but sandhills and flats, running north 20° west, about two to the mile, and from 50ft. to 100ft. in height.

Near the 161st milepost is a bed of quartzite, with veins of quartz, opal, and ironstone; dip, 70° north. North of this for about twenty miles are stony hills and plains, with here and there outcrops of rock; by the 180th milepost are beds of quartzite and limestone, forming a low ridge; dip, 20° west. Ten miles west, after passing two or three isolated hills of granite and quartzite, with flats of red clay strewn with quartz, and having low sandhills, are a series of low ranges of quartzite, with large creeks, in the deep beds of which are some fine waterholes. Passing on west are low sandhills, with here and there points of granite and quartz standing up through the sand; and at ten miles is a hill of granite with quartz reefs about 100ft. high. From here to the north-west, as far as I could see, are all ranges, gradually increasing in height in that direction, where there must be some hills of considerable elevation.

I had not time to see more of these ranges, as I was recalled to town after making this last flying trip.

General Remarks.

The secondary formation, found near Farina and the north end of the range generally, continues north for about 150 miles from the east and west boundary line, and the rocks generally are ferruginous sandstones and quartzites, white feldspathic quartzose sandstone, pipeclay, and blue clay, overlaid by the tertiary table hills of jasper rock (desert quartzite), with gypseous marls, marlstones, and clay; also the newer or post-tertiary sandhills, drifts, and clay.

The sandhills appear to derive their origin from the weathering of the tertiary jasper rock, with which all the clay flats are strewn, most probably whilst this country was under the action of waves in shallow sea; the salt also seems to point to this conclusion.

Their direction is apparently derived from the wind, as sand has always a tendency to stand in ridges across the prevailing winds, and to gradually travel before it, as these hills are evidently doing, being very steep on the east side, whilst the west rises with a gradual slope; this motion is, however, greatly checked by the vegetation, which is pretty thick on these hills. This is also the cause of the height, as the wind piles up the sand from the flats, but does not so easily blow it down the other side.

HARRY P. WOODWARD, F.G.S., Assist. Govt. Geologist.

December 24th, 1884.

REPORT on the MINES, HILLS, &c., of the RANGE to the EAST of FARINA and LEIGH'S CREEK RAILWAY STATION.

FORMATION.

This country is composed of a series of rough ranges, the rocks of which are mostly of primary (lower silurian) age, without any trace of fossils, and having a general strike east and west. There are one or two patches of the tertiary and secondary formation, as outlyers, capping some of the hills, as Mount Babbage and the Cutaway Hills; also a small patch near Mount Fitton, which is all that is left of what once filled the basin here.

The plains that flank the ranges to the north, east, and west are of secondary age clays, with tertiary table-hills of quartzite and gypseous marls.

The stratified rocks of the range are—

I. Sandstones (quartzose), grits, and quartzites, often micaceous and ferruginous.

These are the newest beds, and are well seen in two or three sharp synclinals on the tops of the hills, as at Mount Jeffery and Mount Lyndhurst. They also form the rough range of hills from Mount Telford to Kate's Hill, and on towards Mount Serle. They have not proved metalliferous, although traversed by many quartz reefs of considerable size.

II. Clay slates and flags, mostly calcareous, with beds of massive limestone and dolomite, often crystalline and sometimes micaceous, intersected by calcite veins, and more rarely by small quartz reefs. Some of the crystalline limestones have much more the appearance of reefs than beds.

These beds underlay the sandstones, and form the rocks of most of the north end of the range in a series of synclinals and anticlinals between Mount Lyndhurst and Freeling, and south from Mount Telford to Umberatana and Billy Springs. The massive limestones form rough, low ranges between Patsey's and Jeremiah's Springs; also near Mount Livingston and Billy's Springs, where there is a bed of fine white marble about 6ft. to 8ft. wide, which is traceable for some miles, with thick beds of grey and often micaceous marble.

The reefs are generally small, but well defined, and carry copper, lead, and other metals, particularly near Mount Lyndhurst, Mount Bourne, Fortress Hill, and Gills Bluff.

III. Clay slates and quartzite (with quartz and ironstone reefs), often much kaolinzed, especially in the neighbourhood of lodes.

Towards the north-east end of the range these beds gradually change their lithological characters into a conglomerate, with boulders from several tons in weight to small pebbles of quartzite, sandstone, granite, limestone,

9,559.42
Gr 81 repo Lent

stone, marble, and slate, scattered through a slaty matrix, of which there are large patches, without any boulders or pebbles.

These beds, from their resemblance to boulder-clay, have most probably been formed in a similar manner, viz., by floating ice dropping boulders and pebbles on to clay beds in process of formation.

They are, from their marked characters, traceable through gradual change into gneiss and granite, where all the boulders, with the exception of the quartzites, are also changed into granite, but generally of a different texture from the matrix, so that, on weathering, the boulders come out in their original shapes.

The slates are seen in small strips of country, mostly in the centres of anticlinals or by faults, as at Mount Coffin, where they carry copper.

The boulder slate runs from the Daly and Stanley Mines to Hamilton Creek and Billy's Springs. They have several large quartz and ironstone reefs in them, which latter should be prospected, as they are often the cappings of lodes.

The Metamorphic Rocks are—Granite, gneiss, mica-schist, marble, and quartzite, all bedded, showing the dip and strike.

The Igneous Rocks are—Amygdaloid and greenstone dykes.

All the north-east corner of this range is composed of metamorphic rocks, from Union Trig. to Mount Adams, which are intersected by dykes and reefs, and there is no reason why they should not carry ore.

The only drawback to mining in this part is the extreme roughness of the country.

There are, I believe, two main lines of fault, one near the Daly and Stanley Mines, and the other near Patsey's Springs.

HILLS AND MOUNTAINS.

Mount Jeffery, 2,400ft.—Quartzose sandstone and quartzite, strike east, 20° south, dip on south side, 60° to 70° north, and on north side, 60° to 70° south, with underlaying calcareous slates with the same dip.

Mount Telford, 1,300ft., and Mount Kate.—Quartzose sandstone and quartzite overlaying limestones and calcareous slates, strike east 20° south on south side, dip 70° south, and on north side, 65° south.

Mount Bourne.—Quartzites and sandstone with a jasper reef, and veins of crystalline quartz. To north white slates, dip 62° south, with quartz reefs crossing them north and south, carrying micaceous iron and some copper stains.

Punche's Rest.—Massive limestone, dip south.

Tower Hill.—White calcareous slates with a bed of quartzite standing up in centre, from which it derives its name.

Mount Lyndhurst, 1,150ft.—Quartzite and sandstone, with a yellow and red crystalline jasper reef, strike north 35° west, dip on the north side to south-west, and on south to north-east. Lower down the hill are much altered slates, with quartz and micaceous iron.

Nicholl's Knob, 1,200ft.—Calcareous flags, dip 12° north-west.

Gill's Bluff, 1,370ft.—Calcareous flags almost horizontal, being the centre of a synclinal. Several calcite reefs.

Wadmore's Hills.—Calcareous slates, dip south.

White Banks.—Tertiary table-hills of quartzite and limestones, on gypseous marls.

Hasses Mound.—All similar to the last.

Jones's Hill.—Slaty flags, dip north.

Mount Crocker, 2,800ft., and Mount Harris.—Slaty conglomerate and quartzite, dip east-south-east.

Mount Brooks and Partridge.—Calcareous slaty flags.

Dingo Hill.—Slate and quartzite, dip south.

Wildman's Bluff.—Slate, dip south.

Quartzose Peak, 1,370ft.—Quartz reef, dip south.

Day's Hill.—Slate, dip north.

Mount Freeling.—Slate and limestone, dip north.

Mount Gardner.—Slate and limestone, dip north.

Mount Distance, 1,500ft.—Slate and quartzite, dip south.

Freeling Water and Emu Hills.—Table formation. Tertiary on slate.

Duckpond Hills.—Slate, dip north.

Wallaby Hill.—Slate, dip north.

Union Trig., 1,100ft.—Granite and quartzite, dip south-west.

Mount Fitton, 1,500ft.—Quartzite and slaty conglomerate, dip east; here there are some remarkable variations in the dip and strike.

Mount Livingston, 2,000ft.—Dolomite limestone, no visible dip.

The above heights are by barometer measurement.

Leigh's Creek Copper Mine is situated to the north of the Mount Coffin ridge, and about four miles to the east of the trig. There are two lines of lode, both of which have been worked; most has been done on the north lode, where three shafts have been sunk, one to about 100ft. The lode consists of calcites, ferro-calcites, quartz, and gossan, with blue and green carbonates, dipping 45° south. The south lode, which is higher up the hill, has been opened in a good many places along its outcrop. A long tunnel was driven into the hill, but has now fallen in. The rocks are altered slates and sandy flags, dipping north 20° east. Judging from the indications at the surface, this lode is likely to be a good one.

Tower Hill Copper Mine.—About half a mile north of Tower Hill is a small vein of ore, which is being worked by three men formerly in the employ of the Avondale Co.

They have sunk an underlay shaft about 60ft., at the bottom of which is a drive along the lode of 40ft.; and have also put down a vertical shaft, but owing to the change of dip in the lode, which starts at 30° for 10ft., then changes to 56° east, they did not cut it were they expected, and so abandoned it.

The lode is a rich seam of grey ore, speckled with pyrites stained with carbonates, having crystals of atacamite in the cavaties; the whole is mixed with a little ferro-calcite, and is about 6in. to 8in. wide, but gradually increasing in depth by the addition of small leaders.

There are no defined walls. This, with its change of dip, lead me to believe that it is only an offshoot of a large calcite reef carrying copper stains about 20ft. to the west, and running parallel with it; if such be the case, it will most probably join shortly and assume a decided lode appearance.

The rocks are hard and much-jointed calcareous slates, dip north 75°.

Victory Copper Mine.—About three miles east of Mount Bourne.

The lode is dipping 68° east, and is about 3ft. wide, with a well-defined footwall, but no signs of a hanging one. The ore is grey with some carbonates, oxides, silicates, and is now making into sulphides; it runs in a shoot dipping to the north at 45°, and is from 30ft. to 40ft. long, and 20in. wide. It has been worked to a depth of 170ft. by an underlaying shaft, but they have not yet struck water. There are two or three other shafts connected to the main one by drives, between which all the ore has been stoped out. This ore shoot has twice pinched out, and is now making again for the third time.

The rocks are quartzite, dipping to the south in the hill itself, whilst all round about and to the east along the strike they are calcareous slates and limestones.

It is now being worked on tribute by Capt. Williams, who informed me that this mine has been worked two years, during which time over 300 tons of ore have been sent away, which averaged over 30 per cent.

South Creek Copper Mine is situated on a large creek, about four miles to the north of the Burr Well. It has been worked on three lodes; the one to the south, which is about 8in. wide, dip 82° south, has a good hanging wall, and is composed of earthy and nodular masses of green carbonate, in a decomposed white slaty mullock, which had to be puddled to extract the ore. The lode has been worked to a depth of about 70ft., where the water was struck. About 3ft. to the north is another small lode, about 6in. wide, in a clacite vein; the ore here is grey, speckled with pyrites. This has a well-defined footwall, which leads me to the conclusion that they are one lode, or will make into one at no great distance from the surface. These veins are easily traced at the surface, for some distance to the west carrying copper stains.

To the north, three chains on the top of a hill on the other side of the creek, is an old shaft which has fallen in, sunk on a lode with a good footwall composed of white calcite, quartz, and gossan, with grey ore and pyrites, about 8in. wide. The rocks, which are calcareous slaty flags, dip to the south-west. About one mile to the north-west-by-west is another batch of old workings near the top of a hill, the cap of which is composed of a pebble conglomerate underlaid by slaty flags, dipping to the north-west 30°; between these is a bed of white decomposed slate, in which are nodules of green carbonates. This has been worked for two or three chains along its outcrop, and followed down the underlay, but most of this has now fallen in. One or two small pieces of ore laying about here are of good quality. The principal workings have fallen in.

Webb and Robertson's Copper Mine is about one mile east of Nicholl's Knob; the lodes which follow the strike of the rocks are in calcareous slates, dip 67° east 20° north, much jointed.

There are altogether three lodes that have been opened. The one to the north is about 8in. wide, of calcite and gossan, with grey ore and pyrites; this has only been prospected. The middle lode, 4ft. wide, of calcite and quartz, with small veins of grey ore and pyrites, has a shaft 30ft., but not much work has been done.

The south lode is about 2ft., with two 4in. seams of grey ore with calcite. The walls are not good, being faulted in many places by the slates, which have slipped on their cleavage plains; this has broken the lode a good deal. A good lot of work has been done on this lode. On the top of the hill is a shaft about 70ft., and it has also been worked along the underlay from the gully, and opened along its outcrop in places for a distance of eight chains.

One long tunnel and several smaller ones have been put into the hills, and a long costeen has been run across the flat, but without getting any indication of other lodes.

This mine is now abandoned, and does not appear to have been worked to any great extent.

Avondale Lead Mine.—Information regarding these mines is given, page 9 of the annual report of the Geological Department for 1882-83.

Subsequently a shaft has been sunk to a depth of about 100ft., from which and others a large quantity of ore has been raised, some of which is still laying on the ground.

The galena is still visible in quantity in the shafts and outcropping along the surface, and should be mined at very little expense. The distance to the nearest railway station, viz., Mount Lyndhurst siding, is only fifteen miles, over a good road.

Gill's Bluff Antimony Mine.—A further examination was made. There is no true lode, but some thin ferro-calcite leaders dip 20° south-east, carrying a small quantity of ulminite, which pinches out about 20ft. from the outcrop. The line of this vein is traceable north-east and south-west for a few chains, with cross veins of calcite and quartz, copper-stained.

The main working has been opened up in the form of a quarry, with open drives into the side of the hill. A few small holes have been sunk to the north-east, but it has never been properly tried. The flags are much jointed, and full of calcite veins in the workings containing ulminite; but not proving rich enough to work, they were never followed down.

I should certainly recommend some of these smaller veins to be followed, as the way the vein that has been worked is running does not lead one to suppose it to be a lode, but rather a cross leader, whilst the smaller ones that are following the strike are much more likely to make into a lode in depth. This locality deserves further prospecting.

Throughout this report I have used the miner's term "grey ore" for the massive mixed ore composed of two or three of the following minerals in varying proportions, viz., malachite, cuprite, malacolite, atacamite, chalcocite, and chalcopyrite.

GOLD.

Billy Springs.—About a mile south of these springs, a little digging has been done in some shallow sinking ground on a limestone bottom, strewn with quartz wash from a large reef a little to the east. The samples of gold shown me by Messrs. Gow & Hill from here are coarse, rough, and must have come directly from the reef, as they showed no signs of being water-worn.

Mount Fitton.—About two miles south-east of the trig. is a quartz reef, with hematite and gossan, which, when crushed, yielded specks of fine gold.

Quartzose Peak, Freeling, about two and a quarter miles south-east, has been prospected; but nothing payable has been found.

The basin-shaped area around Mount Fitton seems to be a favorable locality for gold-prospecting, both on reefs and in the alluvium.

About half a mile south of Mundy Water are some quartz and ironstone reefs, near an amygdaloid dyke, which should be prospected for gold.

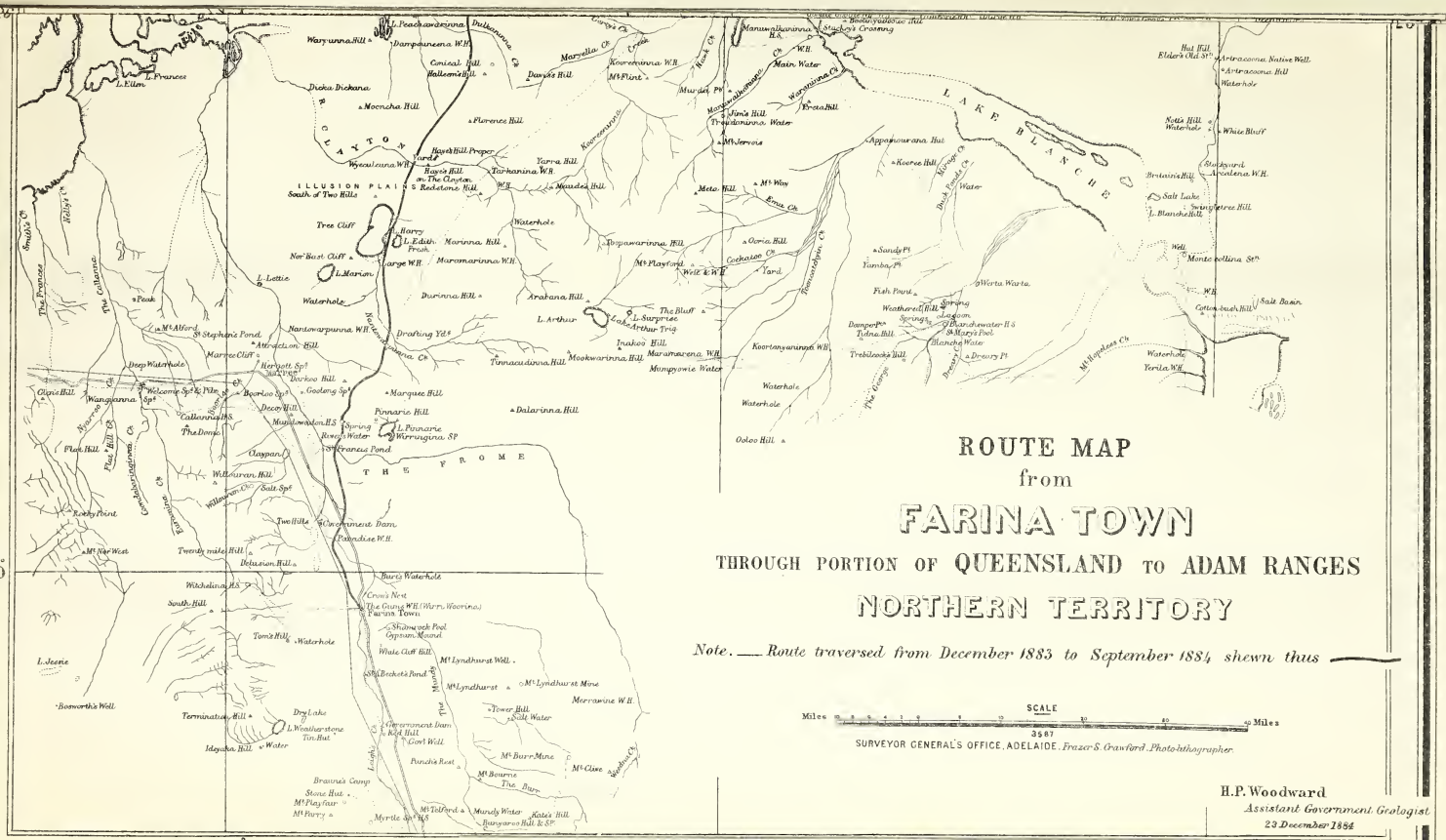
HARRY P. WOODWARD, F.G.S., Assist. Govt. Geologist.

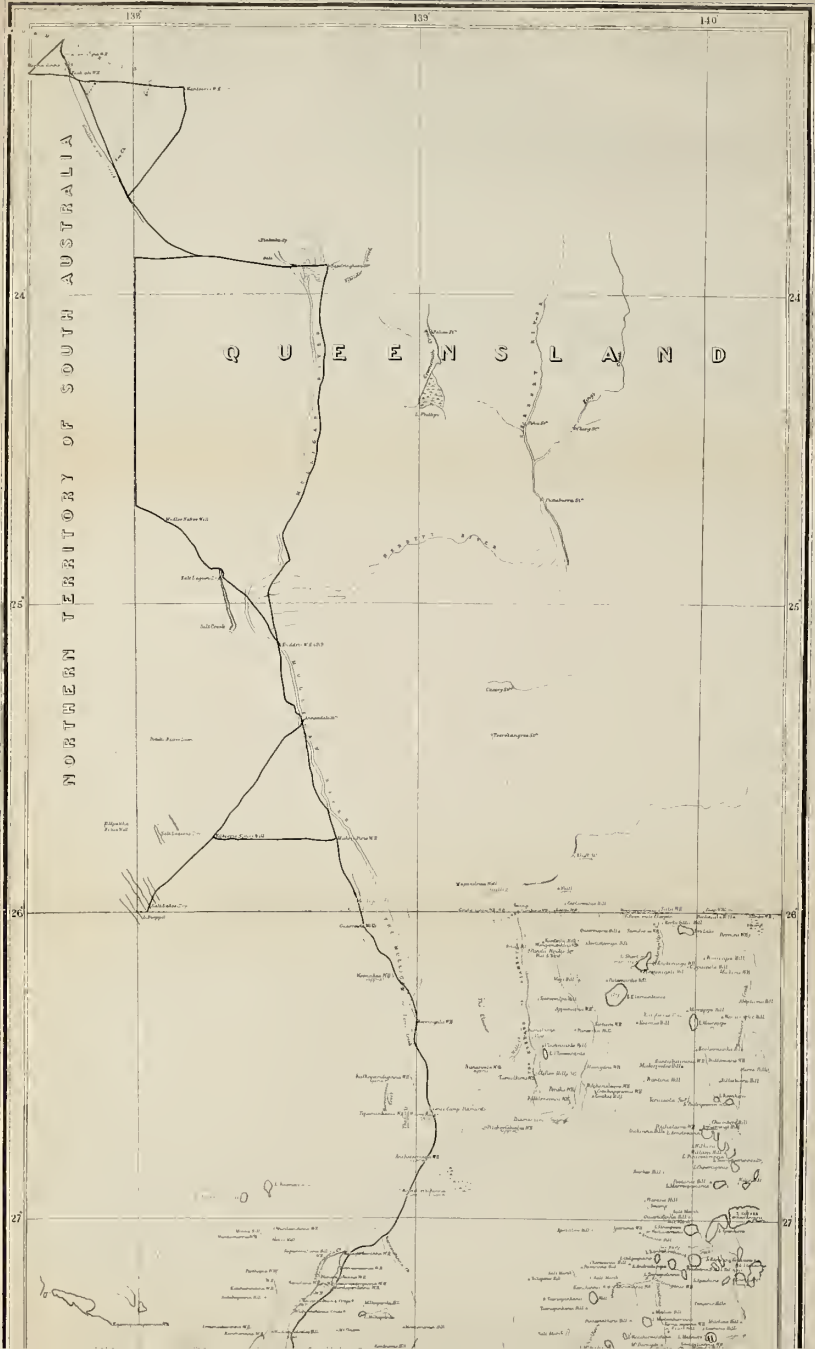
December 24th, 1884.

Spring or Well.	Nearest Trig.	Formation.	Quality of Water.
Patsey's Springs	Mount Jeffrey	Sandstone on slate	Good
Fink Springs	"	"	"
Mundy Water	Mount Telford	Sandstone on limestone	Brackish
Bunyaroo Springs	Kate's Hill	"	Good
Jeremiah Springs	"	"	"
Depôt Springs	—	"	"
Freeling Springs	Wallaby Hill	Calcareous slate	"
Billy's Springs	Union Trig.	Limestone on slate	"
Fitton	Mount Fitton	Quartzite and slate	"
Livingston	Mount Livingston	Limestone	"
Hamilton Creek	Parabarana Hill	Granite	"
Punche's Rest	Punche's Rest	Limestone	"
Lesley's Well	Mount Lyndhurst	Slate and quartzite	"
Mount Lyndhurst Station	Mount Lyndhurst & Gill's Bluff	Quartz reef	"
Gill's Bluff Well	Gill's Bluff	Calcareous slate	"
Walter's Well	"	"	"
Knob Well	Twin's Hills	Alluvium	Brackish
Pelican Well	Dingo Hill	Slate and quartzite	Salt
Freeling	Quartzose Peak	Quartz reef	Good
Old Freeling	Wallaby Hill	Alluvium	"
Yuelina	Jones's Hill	Calcareous slate	"
Tindelphana	Mount Crocker	Boulder slate	"
Daly and Stanley Mine	Daly's Bluff	Alluvial	"
Yudnamutana Mine	Yudnamutana	Alluvium	"
Wattleowie	Mount Babbage	Granite	"
Burr	Mount Kate	Slate and limestone	"
South Creek Mine	—	Calcareous slate	Salt
Victory Mine	Mount Bourne	Amygdaloid dyke	"
Tower Gap	Nicholl's Knob	Calcareous slates	Good
Tower Hill	Tower Hill	"	Brackish
Avondale Station, No. 1	"	Slate	"
Avondale Station, No. 2	"	"	Good

Digitized by the Internet Archive
in 2016 with funding from
University of Illinois Urbana-Champaign

https://archive.org/details/reportsongeology00sout


ROUTE MAP
from
FARINA TOWN
THROUGH PORTION OF QUEENSLAND TO ADAM RANGES
NORTHERN TERRITORY
Note.—Route traversed from December 1883 to September 1884 shewn thus
SCALE
Miles 0 1 2 3 4 5 10 20 30 40 Miles
3587
SURVEYOR GENERAL'S OFFICE, ADELAIDE. Frazer & Crawford Photo-lithographer.
H.P. Woodward
Assistant Government Geologist
23 December 1884
LAKE BLANCHE
CLAYTON
ILLUSION PLAINS
THE FROME
138°
139°
140°
30°


138
139
140
24
25
26
27
NORTHERN TERRITORY OF SOUTH AUSTRALIA
QUEENSLAND

SOUTH AUSTRALIA
ROUTE MAP
from
FARINA TOWN
THROUGH PORTION OF QUEENSLAND to ADAM RANGES
NORTHERN TERRITORY
Note. — Route traversed from December 1883 to September 1884 shown thus
SURVEYOR GENERAL'S OFFICE ADELAIDE
H P Woodward
Assistant Government Geologist
27
28
29
30
138
139
140